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Draining Field Ponds

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DRAINING FIELD PONDS

Last November Ray Hubbard hired a caterpillar D-8 and an 8-yard carryall to build surface drainageways on his farm located between Nevada and Ames, Iowa. This aerial view shows how Ray's farm was spotted with ponds and potholes. Note how the ponds in the upper right have chopped up his corn rows for cultivating.

Those reclaimed acres will come in handy from now on. And there will be a lot less turning around with field machinery.

by Kenneth K. Barnes

MANY IOWA farmers are discovering that their old tiling systems aren't doing the job any more. Heavy cropping has caused the soil to pack, so that more of the water runs off. It collects in low spots instead of seeping down into the tile. For the long-time solution, we need better soil management—more legumes, more organic matter.

But for immediate help, often a little surface drainage will take the water off. And you'll save a few crop acres from damage every year. And it's not just the acre loss that counts. Every farmer knows the inconvenience of working around these potholes with his machinery. Not to mention the time lost when you get too close with your tractor and spend a day mired in the mud.

Four years ago we set out a system of shallow surface drains on the Agricultural Engineering Research Farm at Ames. This farm was supposed to have good tile drainage. But even though there are several surface inlets to the tile system on this farm, potholes had been flooding experimental crops for several years.

After a heavy rain, water would stand on these spots for several days; the tile wouldn't handle it. So we built surface drains to help take care of the excess. Standing surface water hasn't bothered us since.

How to Build Them

In laying out a good surface drain it is important to get it properly surveyed. Some farmers have done this for themselves; but it isn't an easy job. It takes equipment. You can't do it with your eye. Ask your local soil conservation people to help you survey the channels. They have the equipment. And they'll help you lay out a system that will fit in with your farming operations. A good surveyor can help you cut down on the amount of digging needed, too.

You can cultivate right through ditch channels if your land is fairly level. Ditching that doesn't erode and that's easy to maintain requires a flat grade—0.15 foot (about 1¾ inches) per 100 feet is the limit for silty soils. If your soil is heavier, grades up to .20 foot (that's 2.4 inches) per 100 feet will probably be safe. But stay away from this limit if possible; you don't want your drainage channel to be the start of a nice field gully. If your drainage channel is going to have a steeper grade than this, you'd better seed it down and make a grassed waterway out of it.

Slopes up to 3 feet per 100 are safe enough if the channels are well sodded. But grades above this amount should be used only where the run-off area is very small (not over 5 acres at the most).

Side Slopes

The flatter you can keep your side slopes, the easier it will be to run field machinery through drainage channels. Also, the deeper your channels are the flatter you've got to slope the sides. If your channel isn't over 1 foot deep, a slope of 7 to 1 will do for the sides. But you'd better flatten your slope out to 10 or 12 to 1 for cuts that run to 2 feet or over.

The Extension Service has mimeographed recommendations for using the whirlwind terracer

in building slopes. (Ask your county extension director about them.) You'll want to make some extra allowances in digging these slopes. We've found that in using an excavating plan for a side slope of about 15 to 1, we generally get an actual side slope of about 7 to 1 in the finished channel. It's the slope on the finished job that counts.

What Equipment?

You can probably build shallow channels with the equipment on your farm. Disk terracers, disk plows, moldboard plows and light utility blades all work fairly well if you don't have to dig too deep. Channels not more than 1 foot deep are about the limit for this kind of equipment. For deeper cuts light equipment is not apt to give satisfactory results. And your costs may run higher than with larger machinery.

When plowing out drainage channels, plowing shallow at high speeds gives better results than a fewer number of rounds with deeper furrows and low speeds. You can avoid piling up a ridge of dirt (spoil banks) on the top edge of your side slopes if you'll start each new plowing about 2 or 3 furrows outside the last one.

The whirlwind ditcher and the whirlwind terracer are the common pieces in medium size equipment. Such machinery will make good cuts up to 1½ feet; but it's doubtful if you can do a good job to more than 2 feet deep. Custom rates on these machines run about $5 an hour, including hire of the tractor.

Road Blades for Some Jobs

Road blades and motor patrols fall in the medium equipment class, too. But they are often unwieldy when working in close quarters, where much of this work is done. If your cut goes deeper than 1 foot, the spoil bank (that's the edge of dirt that piles up on the edge of your side slope) needs special attention. You can spread it with a blade grader. The cost won't amount to very much.

For extensive work or where the average cut runs deeper than 2 feet, you will probably be better off to hire a contractor with heavy equipment to do your digging for you. The contract price for bulldozers and carryalls runs around $15 an hour. With this equipment the dirt you dig can be spread in the low areas. That way the channels will have gentle side slopes and the excess dirt is not a problem. When digging this deep, however, consider the depth of the topsoil and the danger of exposing tile to frost damage. It is seldom advisable to work deeper than 3 feet.

The Extension Service has built four sets of shallow surface drains on a demonstration basis. Two of these are in Wright and Hardin counties. Another set was built to drain ponds in the Iowa River bottomland in Marshall County.

Maintaining the Channels

You can maintain the shallow surface drains by plowing out, much the same as in maintaining a terrace. If necessary, you can always have the drains cleaned out and deepened or the banks leveled with a whirlwind terracer. A little care used when working through these drains with field machinery will help to maintain them—and keep your low spots from collecting water.

Deep Ponds

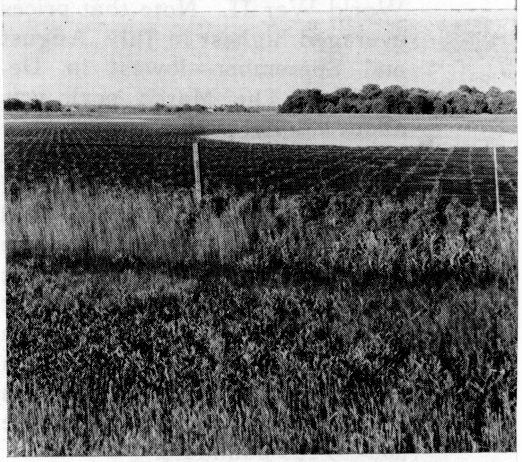
If you have a drainage problem that requires digging deeper than 3 feet, you'll want another solution. Digging surface drainage that deep will be more trouble and expense than it's worth. For these situations we think a corrugated metal pipe or a glazed sewer tile might do the job. Such a drain should have a diameter not less than 12 inches. But make sure it has the capacity to drain your pond in 24 hours. Pipe ends will need to be protected from livestock and rodents by fencing, screens or other outlet gates. If glazed sewer tile is used, the joints should be sealed to prevent roots from entering the drain. Careful construction of these items will cut down your maintenance problem.

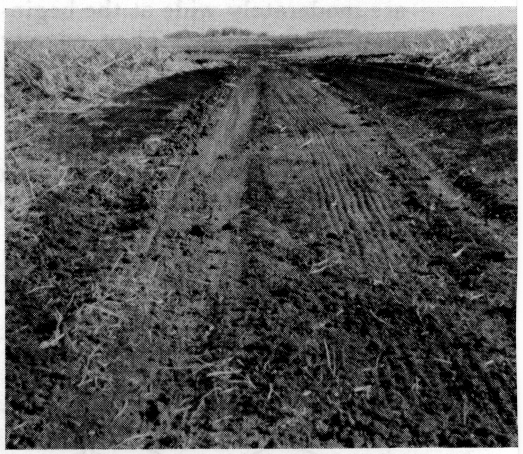
During recent years there's been more than the usual crop damage from flooding in low spots. Alfalfa and other legume crops winterkill if they lie underwater too long in the spring. Small grains and corn may suffer if they are flooded for as long as 24 hours. More than 72 hours of flood is apt to destroy them.

Surface drainage can help you avoid this damage. For lack of drainage there are cropless acres on many farms, especially in north-central Iowa.

Now, more than in ordinary years, it will pay you to drain low spots on your farm. With good prices such improvements will soon pay for themselves.

These ponds and potholes are seldom more than 2 feet deep. On the average they may run 1 or 2 acres in size. Not large—but lots of trouble and a long-time loss that you can't afford.





The top picture is typical of what a lot of Iowa fields look like every spring. Along comes a good rain; and part of your corn crop is drowned out.

Drainageways like the one shown below may be the solution. With flat side slopes you can cultivate right through them.